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## (54) REFRACTIVE SURGERY AND PRESBYOPIA CORRECTION USING INFRARED AND ULTRAVIOLET LASERS

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(57)

## ABSTRACT

A method and surgical technique for corneal reshaping and for presbyopia correction are provided. The preferred embodiments of the system consists of a scanner, a beam spot controller and coupling fibers and the basic laser having a wavelength of (190-310) nm, (0.5-3.2) microns and (5.6-6.2) microns and a pulse duration of about (10-150) nanoseconds, (10-500) microseconds and true continuous wave. New mid-infrared gas lasers are provided for the corneal reshaping procedures. Presbyopia is treated by a method which uses ablative laser to ablate the sclera tissue and increase the accommodation of the ciliary body. The tissue bleeding is prevented by a dual-beam system having ablative and coagulation lasers. The preferred embodiments include short pulse ablative lasers (pulse duration less than 200 microseconds) with wavelength range of (0.15-3.2) microns and the long pulse (longer than 200 microseconds) coagulative lasers at (0.5-10.6) microns. Compact diode lasers of (980-2100) nm and diode-pumped solid state laser at about 2.9 microns for radial ablation patterns on the sclera ciliary body of a cornea are also disclosed for presbyopia correction using the mechanism of sclera expansion.

15 Claims, 3 Drawing Sheets

